

*Subj D1*  
*cont*

34. The process of Claim 33, wherein the water present in said polymerization diluent is present as particles having a median particle size in the range of from about 0.5  $\mu\text{m}$  to about 8  $\mu\text{m}$ .

35. The process of Claim 33, wherein the water present in said polymerization diluent is present as particles having a median particle size in the range of from about 0.5  $\mu\text{m}$  to about 6  $\mu\text{m}$ .

36. The process of Claim 33, wherein the water present in said polymerization diluent is present as particles having a median particle size in the range of from about 1  $\mu\text{m}$  to about 5  $\mu\text{m}$ .

37. The process of Claim 33, wherein the organic solvent of said polymerization diluent is selected from the group consisting of an aliphatic compound, an aromatic compound and mixtures thereof.

38. The process of Claim 37, wherein said aliphatic compound is selected from the group consisting of a saturated hydrocarbon, an unsaturated hydrocarbon and mixtures thereof.

39. The process of Claim 38, wherein the saturated hydrocarbon is selected from the group consisting of a C<sub>4</sub>-C<sub>10</sub> aliphatic hydrocarbon, a C<sub>5</sub>-C<sub>10</sub> cyclic aliphatic hydrocarbon, a C<sub>6</sub>-C<sub>9</sub> aromatic hydrocarbon, a C<sub>2</sub>-C<sub>10</sub> monoolefinic hydrocarbon and mixtures thereof.

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40. The process of Claim 39, wherein the C<sub>4</sub>-C<sub>10</sub> aliphatic hydrocarbon is selected from the group consisting of butane, pentane, hexane, heptane, octane and mixtures thereof.

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41. The process of Claim 39, wherein the C<sub>2</sub>-C<sub>10</sub> monoolefinic hydrocarbon is selected from the group consisting of butene-1, pentene-1, hexene-1 and mixtures thereof.

42. The process of Claim 39, wherein the C<sub>5</sub>-C<sub>10</sub> cyclic aliphatic hydrocarbon is selected from the group consisting of unsubstituted cycloalkanes, methyl substituted cycloalkanes, ethyl substituted cycloalkanes and mixtures thereof.

43. The process of Claim 39, wherein the C<sub>5</sub>-C<sub>10</sub> cyclic aliphatic hydrocarbon is selected from the group consisting of cyclopentane, cyclohexane, cyclooctane and mixtures thereof.

44. The process of Claim 39, wherein the C<sub>6</sub>-C<sub>9</sub> aromatic hydrocarbon is selected from the group consisting of benzene, toluene, xylene and mixtures thereof.

45. The process of Claim 33, wherein the organic solvent of said polymerization diluent comprises a mixture of cyclohexane and butene-1.

46. The process of Claim 33, wherein said polymerization diluent additionally comprises a polymerization modifier selected from the group consisting of C<sub>2</sub>-C<sub>18</sub> non-conjugated dienes, C<sub>6</sub>-C<sub>12</sub> cyclic dienes and mixtures thereof.

47. The process of Claim 46, wherein the polymerization modifier is selected from the group consisting of 1,2-butadiene, 1,3-cyclooctadiene, 1,5-cyclooctadiene and mixtures thereof.

48. The process of Claim 33, wherein said catalyst comprises a substantially anhydrous cobalt salt and an organo-aluminium halide compound.

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49. The process of Claim 48, wherein the substantially anhydrous cobalt salt comprises a compound corresponding to the formula:



wherein:

A: represents a monovalent anion or a divalent anion;

and

m: represents 1 or 2.

50. The process of Claim 49, wherein the anion is derived from a C<sub>6</sub>-C<sub>12</sub> organic acid.

51. The process of Claim 49, wherein the anion is selected from the group consisting of an acetylacetone, an acetate, a hexanoate, an octoate, an oxalate, a tartrate, a stearate, a sorbate, an adipate and a naphthenate.

52. The process of Claim 48, wherein the substantially anhydrous cobalt salt comprises cobalt octoate.

53. The process of Claim 48, wherein the organo-aluminium halide compound comprises a compound corresponding to the general formula:



wherein:

R: represents a C<sub>2</sub>-C<sub>12</sub> alkyl group;

X: represents a halogen;

and

the sum of p + q equals 3.

*Sub O1 cont*

54. The process of Claim 48, wherein said organo-aluminium halide compound is selected from the group consisting of a dialkyl aluminium chloride compound, an alkyl aluminium sesquichloride compound and mixtures thereof.

*Sub O1*

55. The process of Claim 48, wherein the organo-aluminium halide compound is selected from:

(I) a mixture of:

(a) an alkyl aluminium chloride selected from the group consisting of diethyl aluminium chloride and ethyl aluminium sesquichloride,  
and  
(b) an organo aluminium compound corresponding to the formula:  
 $R_3Al$   
wherein:  
R: represents a C<sub>8</sub>-C<sub>12</sub> alkyl group;  
and

(II) an alkyl aluminium chloride wherein the alkyl group has from 8 to 12 carbon atoms.

*Sub O1 cont*

56. The process of Claim 48, wherein the organo aluminium halide comprises a mixture of:

(a) an alkyl aluminium chloride selected from the group consisting of diethyl aluminium chloride and ethyl aluminium sesquichloride,

and

(b) an organo aluminium compound corresponding to the formula:



wherein:

R: represents a C<sub>8</sub>-C<sub>12</sub> alkyl group.

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57. The process of Claim 55, wherein the organo aluminium compound corresponding to the formula  $R_3Al$  is present in an amount of from 0 to 1% by weight of the mixture.

58. The process of Claim 55, wherein the organo aluminium compound corresponding to the formula  $R_3Al$  comprises tri-octyl aluminium.

59. The process of Claim 48, wherein the substantially anhydrous cobalt salt comprises cobalt octoate and the organo-aluminium halide compound comprises a mixture of diethyl aluminium chloride and tri-octyl aluminium.

60. The process of Claim 59, wherein the molar ratio of cobalt octoate to the total of diethyl aluminium chloride plus tri-octyl aluminium is from about 1:15 to about 1:30.

61. The process of Claim 59, wherein the molar ratio of chlorine in diethyl aluminium chloride to the total aluminium in diethyl aluminium plus tri-octyl aluminium is from about 0.7:1 to about 0.95:1.

62. The process of Claim 33, wherein the water is mixed with the polymerization diluent by a mechanical method.

63. The process of Claim 33, wherein the water is mixed with the polymerization diluent by sonic treatment.

64. The process of Claim 33, wherein the polymerization temperature is in the range of from about 5°C to about 40°C. --